

We claim:-

1. A process for the production of photopolymerizable cylindrical continuously seamless flexographic printing elements by application of a layer of a photopolymerizable material, comprising at least one elastomeric binder, ethylenically unsaturated monomers and a photoinitiator, to the outer surface of a hollow cylinder and joining of the layer ends by calendering, wherein the process comprises the following steps:
 - (a) providing a laminate at least comprising a layer of a photopolymerizable material and a substrate film which can be peeled off from the layer,
 - (b) cutting the edges of the laminate to be joined to size by means of bevel cuts,
 - (c) pushing the hollow cylinder onto a rotatably mounted support cylinder and locking it thereon,
 - (d) applying an adhesion-promoting layer to the outer surface of the hollow cylinder,
 - (e) applying the laminate cut to size, on the side facing away from the temporary substrate film, to the hollow cylinder provided with the adhesion-promoting layer, the ends provided with the bevel cut substantially resting against one another but not overlapping,
 - (f) peeling off the substrate film from the layer of photopolymerizable material,
 - (g) joining the cut edges at a temperature below the melting point of the photopolymerizable layer by bringing the surface of the photopolymerizable layer on the hollow cylinder into contact with a rotating calender roll until the cut edges are joined to one another,
 - (h) removing the processed hollow cylinder from the support cylinder.

2. A process as claimed in claim 1, wherein the adhesion-promoting layer is a double-sided adhesive film.
- 5 3. A process as claimed in claim 2, wherein the adhesion film has a static shear strength, measured according to DIN EN 1943, of at least 3 h at 70°C.
4. A process as claimed in any of claims 1 to 3, wherein the layer of photopolymerizable material comprises a further peelable film on that side of the layer which faces away from the substrate film, which peelable film is peeled off
10 before process step (d).
5. A process as claimed in any of claims 1 to 4, wherein, before process step (d), the layer of photopolymerizable material is preexposed to actinic light, directly or
15 through the second peelable film, from the side facing away from the substrate film.
6. A process as claimed in claim 5, wherein the preexposure is effected before process step (b).
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7. A process as claimed in any of claims 1 to 6, wherein the coated hollow cylinder rotates in the direction (7) during calendering.
8. A process as claimed in any of claims 1 to 7, wherein the temperature of the plate surface during calendering is from 80 to 130°C.
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9. A process as claimed in any of claims 1 to 7, wherein the support cylinder is an air cylinder.
- 30 10. A process as claimed in any of claims 1 to 9, wherein, in a further process step (i), a digitally imagable layer is applied to the photopolymerizable layer.
11. A process as claimed in claim 10, wherein the digitally imagable layer is one selected from the group consisting of IR-ablative layers, inkjet layers and thermographically recordable layers.
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12. A cylindrical, continuously seamless, photopolymerizable flexographic printing element obtainable as claimed in any of claims 1 to 9.

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13. A cylindrical, continuously seamless, photopolymerizable flexographic printing element having a digitally imagable layer and obtainable as claimed in claim 10 or 11.
- 5 14. The use of a digitally imagable cylindrical flexographic printing element as claimed in claim 13 for the production of cylindrical, continuously seamless flexographic printing plates, wherein the digitally imagable layer is recorded on imagewise, the photopolymerizable layer is exposed to actinic light through the mask formed and unexposed parts of the layer are removed in a development
10 step.
15. The use as claimed in claim 14, wherein the development of the exposed layer is carried out by means of a solvent or solvent mixture.
- 15 16. The use as claimed in claim 14, wherein the development of the exposed layer is carried out thermally.
17. The use of a cylindrical flexographic printing element as claimed in claim 12 for the production of cylindrical, continuously seamless flexographic printing plates,
20 wherein the photopolymerizable layer is completely crosslinked with actinic light and a printing relief is then engraved into the polymerized layer by means of one or more lasers.
18. The use as claimed in claim 17, wherein the laser or lasers has or have a
25 wavelength from 9 000 to 12 000 nm.
19. An apparatus for the production of cylindrical photopolymerizable continuously seamless flexographic printing elements, at least comprising a rotatable air cylinder (8), a rotatable, heatable calender roll (9), a rotatable auxiliary roll (10) and a feed apparatus (11), the distances between the air cylinder and the
30 calender roll on the one hand and the auxiliary roll and the air cylinder on the other hand being adjustable by suitable means.